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## RHYTHM IN HANDWRITING

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The purpose of this article is to present a brief account of the results obtained through extending the former study of rhythm<sup>1</sup> in handwriting to the ages fifteen to eighteen inclusive. The same apparatus, the same process of securing records, and the same devices and technique of measuring the records that were employed in the former study were employed throughout this investigation. The records used in this investigation were secured from the commercial department of the Kansas City, Kansas, High School, and from the two high schools in Lawrence, namely, the Lawrence High School and the Oread Training School, University of Kansas. The writer is greatly indebted to the principals and teachers of the Kansas City and Lawrence high schools for their courtesy and assistance in securing the desired records.

The purpose of extending the study to these upper ages was to discover the relation of rhythm to age, and by comparison of the results in rhythm with the results obtained for the ages seven to fourteen inclusive to discover, if possible, the age or range of ages at which rhythm reaches its maximum development. The study of arm movement was also carried along with the study of rhythm as in the former study, and the results obtained compared with those of the lower ages.

The tables in this study are constructed on the same bases as the corresponding tables in the former study. The table containing the source data and several of the tables of correlations are not reproduced here, but the interpretations of all

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<sup>1</sup> *Elementary School Journal*, February, 1917.

the results are presented. The significant tables on rhythm and arm movement are presented in complete form, showing the complete results for both studies.

TABLE I  
RELATION OF ARM MOVEMENT TO AGE

AGE	ARM MOVEMENT					
	0	1	2	3	4	5
7.....	10	21	2	.....	.....	1
8.....	10	19	4	.....	.....	.....
9.....	3	14	5	7	1	.....
10.....	2	20	4	3	1	2
11.....	6	14	8	2	5	1
12.....	.....	11	12	7	1	2
13.....	1	14	10	6	5	1
14.....	1	16	10	4	4	3
15.....	3	7	5	1	3	4
16.....	4	10	3	3	1	2
17.....	7	8	6	5	2	.....
18.....	5	10	2	2	3	1

TABLE II  
RELATION OF ARM MOVEMENT TO AGE BY SYSTEMS

SYSTEM F

AGE	ARM MOVEMENT					
	0	1	2	3	4	5
15.....	1	1	4	.....	1	3
16.....	.....	4	1	-2	1	2
17.....	1	3	-2	2	.....	.....
18.....	2	2	-1	.....	2	1

SYSTEM G

AGE	ARM MOVEMENT					
	0	1	2	3	4	5
15.....	2	6	1	1	2	1
16.....	4	6	2	1	.....	.....
17.....	6	5	4	3	2	.....
18.....	3	8	1	2	1	.....

## ARM MOVEMENT

Table I brings the entire data on relation of arm movement to age together. Arm movement seems to be quite definitely related to age. A grade of 2 or above must be attained to be worth while. In fact, a grade of 3 must be attained to insure the utilization of arm movement in some degree in making practically all of the letters written. Grades 4 and 5 must be attained to insure the use of arm movement in complete letter formation. Age nine represents the beginning of a sufficient degree of arm movement to be worth while, while ages ten to eighteen inclusive present the possibilities of maximum development of arm movement for a considerable number of individuals. That is to say, enough individuals from ages ten to eighteen attained grades of 4 and 5 to indicate that maturity is one of the most important factors that determines whether or not an individual may reach a high degree of attainment in arm movement.

The median grade for ages seven to eleven inclusive is 1; for ages twelve to fifteen inclusive the median grade is 2; and for ages sixteen to eighteen the grade is 1. The modal grade is 1 for all ages except twelve, for which age it is 2. Table II shows that in system F, which had commercial penmanship, the median grade is 2 for age fifteen, between 2 and 3 for age sixteen, and between 1 and 2 for ages seventeen and eighteen, while in system G, which had only common writing usage, the median grade is 1 for all four ages. The modal grades in system F are 2, 1, 1 for ages fifteen, sixteen, seventeen, respectively, and distributed to 0, 1, 4 for age eighteen, while the modal grade in system G is 1 for all ages. These results show that system F developed considerably more arm movement than is developed for most individuals by ordinary writing practice in system G. That is to say, intensive arm-movement drills will develop more arm movement for individuals who are

naturally capable of acquiring the movement than ordinary writing practice will develop.

These facts cause the writer again to raise the question whether arm movement can be attained by a sufficient number of individuals to a high enough degree to warrant the schools in putting much time on intensive arm-movement drills. The median and modal grades do not get above 2 in any of the systems. A sufficient number of cases in system G and the other systems that have practiced only copybook and ordinary usage of writing attained a grade above 2 to justify one in concluding that many individuals adopt arm movement naturally and develop it to whatever degree it proves of advantage to the writers. On the other hand, as has already been pointed out, a rather large number do not attain a satisfactory degree of arm movement even with the aid of intensive drills.

An important criterion of the value of arm movement for most individuals is perhaps the extent to which it is retained after it has once been developed. Table I shows that from ages thirteen to eighteen inclusive a surprisingly large number of cases drop back to grades 1 and 0. This would certainly not be true if writers in general found arm movement to be of any appreciable advantage in meeting the ordinary demands for using their writing habits. According to the psychology of habit, one tends to discontinue any form of activity that does not meet a given situation adequately. On the other hand, one tends to retain and automatically employ any form of activity that enables one to meet a given situation in a satisfactory manner. If arm movement is a form of writing habit that can and should aid the majority of individuals in attaining skill in writing, then the formation of the habit ought to go forward with little difficulty and should become automatic to a high degree after two or three years of systematic drill. A

habit thus rendered automatic will certainly not be lost for a long time, especially when every individual can make as much use of it as ordinary demands for practicing writing affords.

The force of this conclusion may be brought out more effectively by comparison. The writer at one time mastered quite thoroughly the habit of arm movement in writing. He can still write with practically perfect arm movement when he puts his whole attention upon the employment of the habit. When, however, he just writes automatically, as one does with his attention upon what he is writing, he uses very little, if any, arm movement. Another motor habit which the writer learned at about the same time that he mastered arm movement was that of batting in baseball. The form of standing at the plate and of swinging at the ball became automatic to the extent that the writer never gave thought to either one when playing in a game. This habit was used very little in later years as compared to the use made of the writing habit. Notwithstanding this fact, the writer finds that even after several years of disuse of the batting habit it is seemingly just as automatic and effective as it was when first learned. The reason is that this habit was formed naturally as the most effective means of meeting a given situation. If any other habit could have been used to meet the same situation as satisfactorily, then no doubt the other habit might have been more natural to the writer than the professional form and would have been practiced except when attention was given to practicing the professional form. And, even if the professional form, under such conditions, had been mastered, it would undoubtedly have been lost whenever the writer returned to the game after lapses of time and, without renewed practice, faced the pitcher at a critical time. Whenever one faces a critical situation with his attention upon the results to be accomplished and not upon the means of obtaining the

results, he will always fall back upon those habits that he has naturally formed as the best means for him to employ in meeting this particular situation. The conclusion seems justifiable, then, that arm movement is not retained, after it is mastered, to a sufficient extent to warrant the public schools in putting a great amount of time, or even any time, upon it in writing drills. The writer believes that, if attention is given to the other factors and conditions that are necessary in the mastery of the writing skill, the individuals will adopt and develop for themselves the degree of arm movement that is advantageous to them in acquiring a satisfactory degree of attainment in writing.

#### RHYTHM

Table III brings together all the data on the relation of rhythm to age, and is perhaps the most significant table of the entire investigation. The positive correlation of rhythm to age is clearly shown by the decided piling up of cases along the diagonal from upper left-hand corner to lower right-hand corner of the table. Attention to the median group of cases at each age verifies the significance of the correlation indicated by the diagonal sweep of cases. At age seven the median falls on the second step of the rhythm scale; age eight on the fifth step; nine on the seventh; ten on the eighth; eleven on the tenth; twelve, thirteen, and fourteen on the twelfth; fifteenth on the thirteenth or median step of the rhythm scale; sixteen on the twelfth; seventeen and eighteen on the eleventh step.

Table IV, which is not reproduced here, shows the relation of rhythm to age by systems for ages fifteen to eighteen inclusive. The tabulations indicate that training has no effect upon the development of rhythm. That is to say, rhythm is a trait that develops with age and not with training.

The location of the median group of cases at each age shows that ages twelve, thirteen, fourteen, and sixteen are only

one step below the median grade on the rhythm scale. Ages seventeen and eighteen are two steps below the median rhythm

TABLE III  
RELATION OF RHYTHM TO AGE

RHYTHM	AGE											
	7	8	9	10	11	12	13	14	15	16	17	18
4- 159...	14	5	3	....	I	....	I	....	....	....	....	....
160- 313...	5	3	....	I	I	....	....	....	....	....	....	....
314- 467...	8	I	3	....	....	I	I	....	....	....	....	....
468- 621...	3	3	6	3	4	I	....	I	....	....	....	....
622- 775...	3	6	3	5	I	....	....	2	....	I	....	....
776- 929...	I	2	....	4	2	I	I	2	I	....	2	....
930-1,083...	....	4	2	I	2	4	....	2	....	I	I	....
1,084-1,237...	....	....	2	5	2	2	6	....	I	I	3	I
1,238-1,391...	....	3	3	5	....	2	2	5	I	2	3	4
1,392-1,545...	....	4	4	4	8	....	6	6	2	4	3	4
1,546-1,698...	....	....	I	3	3	5	I	I	I	2	4	4
1,699-1,853...	....	I	....	I	4	6	3	6	2	2	2	3
1,854-2,007...	....	....	2	....	4	3	4	5	5	3	4	2
2,008-2,161...	....	....	I	....	3	2	4	3	2	3	I	....
2,162-2,315...	....	....	I	....	....	3	I	I	I	I	I	....
2,316-2,469...	....	....	I	....	....	2	4	I	2	I	I	2
2,470-2,663...	....	....	....	....	....	....	I	2	2	....	2	2
2,664-2,777...	....	....	....	....	....	....	....	....	2	....	....	I
2,778-2,931...	....	....	....	....	....	I	I	....	I	....	I	....
2,932-3,085...	....	....	....	....	....	....	I	....	....	....	....	....
3,086-3,240...	....	....	....	....	....	....	....	I	....	....	....	....
3,241-3,394...	....	....	....	....	....	....	....	....	....	....	....	....
3,395-3,448...	....	....	....	....	....	....	....	....	....	I	....	....
3,449-3,502...	....	....	....	....	....	....	....	....	....	....	....	....
3,503-3,656...	....	....	....	....	....	....	....	....	....	I	....	....

grade, while ages eleven, ten, and nine are three, five, and six steps, respectively, below the median rhythm grade. Ages nine, ten, and eleven are in the lower part of the middle range of the rhythm scale. The decided growth in rhythm from nine to twelve raises the question as to the extent to which rhythmic organization in writing practice may be of advantage



to the learners at these ages. The fact, which is noted later, that rhythm is positively correlated with speed seems to justify one in concluding that, from age nine on, rhythmic organization in writing practice will be of sufficient advantage to make its use worth while. Ages nine to twelve, however, should not stress rhythmic organization more than is justified by the development of rhythmic organization at these ages. The emphasis may increase as the natural rhythmic organization increases. The range of ages, as has just been indicated, that warrants the most intensive use of rhythmic organization in writing practice is from twelve to sixteen inclusive. Ages seventeen and eighteen show a falling off in rhythmic development, so that evidently rhythmic organization should be utilized to accomplish its maximum results before these ages are reached.

#### OTHER CORRELATIONS

The tables for the other correlations are not reproduced here, but a brief statement is made of the results shown by them. One of the most important of these correlations is that of rhythm with speed. Rhythm is positively correlated with speed for ages fifteen, sixteen, and seventeen. Age eighteen, however, shows no such positive correlation. Age fifteen shows up somewhat better than the other ages. This fact seems to indicate that the maximum of speed may be attained by the time age fifteen is reached. There seems to be some positive correlation between rhythm and quality in these upper ages. While the degree of this correlation is not great, it seems to warrant the conclusion that properly graded rhythmic drills for the different types of letters, along with modifications of the forms of letters which present serious difficulties in maintaining rhythmic habit in writing them, will enable rhythmic organization to contribute appreciably to the attainment of a satisfactory degree of quality in writing.

No correlation was found in these upper ages between rhythm and arm movement. Arm movement has no correlation with speed. And arm movement has no correlation with quality.

#### SUMMARY

Summarizing briefly, one may say that the practical conclusions that may be drawn from the entire study are as follows: (1) A proper utilization of rhythmic organization in writing practice for ages nine to eleven will be of advantage, but the maximum of results will be obtained by the use of intensive rhythmic drills for ages twelve to sixteen. (2) Rhythm may be made to contribute effectively to quality through the proper use of rhythmic drills adapted to the different types of letters. Difficult letters can and should be modified to remove the difficulties they present to free rhythmic movement. (3) Arm movement, having no relation to rhythm, speed, or quality, and being rapidly lost after it has been attained, should be found worth while for its contribution to other favorable conditions that are highly essential, or it should be abandoned in writing drills and general class practice.